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Beltraniella species associated with leaf litter of the Atlantic Forest in southern Bahia, Brazil

Marcos Vinícius Oliveira dos Santos[1*],
Flávia Rodrigues Barbosa[2], Dilze Maria Argôlo Magalhães[3],
Edna Dora Martins Newman Luz[3], & José Luiz Bezerra[1,4]

[1]*Departamento de Micologia, Universidade Federal de Pernambuco,
Av. Prof. Nelson Chaves, s/n°, Recife, PE, 50670-901, Brasil*
[2]*Instituto de Ciências Naturais, Humanas e Sociais, Universidade Federal de Mato Grosso, Avenida Alexandre Ferronato, 1200, Setor Industrial, Sinop, MT, 78557-267, Brasil*
[3]*Setor de Fitopatologia, Centro de Pesquisas do Cacau, Comissão Executiva do Plano da Lavoura Cacaueira, Rod. Ilhéus-Itabuna, km 22, Ilhéus, BA, 45662-000, Brasil*
[4]*Centro de Ciências Agrárias e Biológicas, Universidade Federal do Recôncavo da Bahia, Rua Rui Barbosa, 710, Cruz das Almas, BA, 44.380-00, Brasil*
* Correspondence to: *marcosvos@ymail.com*

Abstract — Two species of *Beltraniella*, *B. botryospora* and *B. portoricensis*, were found to be associated with the leaf litter of representative plants of the Atlantic Forest (*Inga thibaudiana*, *Myrcia splendens*, *Pera glabrata*) in the Reserva Biológica de Una, municipality of Una, Bahia State, Brazil. A description and illustration are provided for *B. botryospora*, reported here for the first time from the Americas. A key to *Beltraniella* species cataloged in Brazil is also presented.

Key words — conidial fungi, taxonomy, *Fabaceae*, *Myrtaceae*, *Peraceae*

Introduction

Beltraniella was proposed in 1952 by Subramanian with the type species *B. odinae* Subram., found in India on leaf litter of *Odina wodier* Roxb. (Subramanian 1952). The genus is characterized by setiform conidiophores and polyblastic sympodial denticulate conidiogenous cells. Conidia are turbinate or biconic and often caudate (Ellis 1971).

Beltraniella species are typically found on decomposing fallen leaves on the ground and other natural substrates (Polishook et al. 1996, Marques et al. 2007, Shirouzu et al. 2009, Magalhães et al. 2011) in tropical and subtropical regions (Kirk 1981). Some species correspond to the anamorphic stage of the ascomycetes *Pseudomassaria* Jacz. or *Leiosphaerella* Höhn. (Kirk et al. 2008).

Currently, approximately 20 species are described in *Beltraniella* (Shirouzu et al. 2010, Priya et al. 2011), of which four have been cataloged in Brazil: *B. amoena* R.F. Castañeda et al., *B. japonica* Matsush., *B. portoricensis,* and *B. fertilis* Heredia et al. (Gusmão et al. 2001, Marques et al. 2007, Magalhães et al. 2011). *Beltraniella portoricensis* and *B. fertilis* have been previously listed as associated with plants endemic to the Atlantic Forest (Magalhães et al. 2011). The present study aimed to identify *Beltraniella* species associated with the leaf litter from three common representative plant species from the Atlantic Forest in the Reserva Biológica de Una, municipality of Una, Bahia State, Brazil.

Materials & methods

The materials were collected in September 2011 and April 2012 in the Reserva Biológica de Una (an Atlantic Forest Conservation Unit), municipality of Una, Bahia State, Brazil. Five specimens of three representative Atlantic Forest tree species were marked and identified in the field as *Inga thibaudiana* DC. (*Fabaceae*), *Myrcia splendens* (Sw.) DC. (*Myrtaceae*), and *Pera glabrata* (Schott) Poepp. ex Baill. (*Peraceae*). The leaf litter of these trees was collected at different stages of decomposition, stored in Kraft paper bags, and sent to the laboratory of Fungal Diversity of the Centro de Pesquisas do Cacau (CEPEC), Comissão Executiva do Plano da Lavoura Cacaueira (CEPLAC), Ilhéus, Bahia State, Brazil.

In the laboratory, the samples were placed in pre-perforated plastic containers and washed gently for one hour in running water so that the water did not hit them directly, thus allowing impurities to be removed. The washed samples were placed in moist chambers, observed after 72 h with a stereomicroscope, and monitored periodically for 30 days. The reproductive structures of the microfungi were removed with a histological needle and placed in a permanent mounting medium containing polyvinyl-lacto-glycerol (PVLG) resin (Silva & Grandi 2011).

The prepared fungal slides were observed using a light microscope, and the species were identified by morphological comparison with specific literature (Ellis 1971, Seifert et al. 2011). Photomicrographs were taken with a Sony Cyber-shot 16.2 megapixel digital camera. Subsequently, the permanent slides were deposited in the Mycological Collection of CEPEC.

Taxonomy

Beltraniella botryospora Shirouzu & Tokum., Fungal Diversity 43: 88 (2010) PLATE 1

COLONIES amphigenous, effused, dark-brown. MYCELIUM immersed in the substrate. SETAE subulate, arising from lobed basal cells, single, erect, straight or slightly curved, simple, septate, verrucose, dark-brown, 112–380 × 4–8 µm. CONIDIOPHORES macronematous, mononematous, with two forms: long conidiophores arising from lobed basal cells, setiform, single, erect, straight

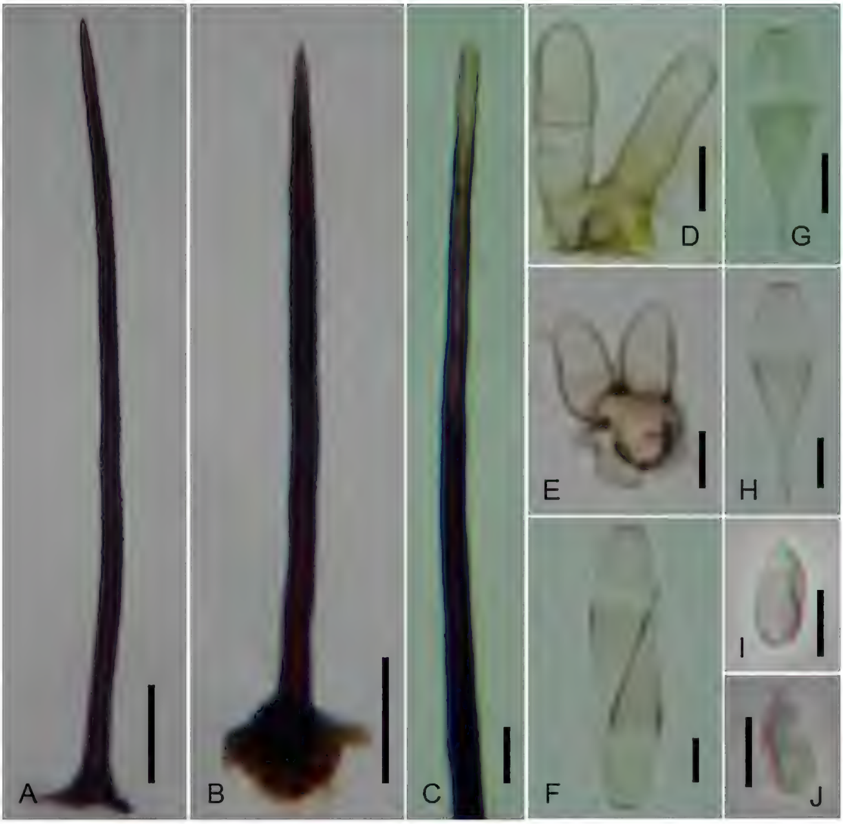

Plate 1. *Beltraniella botryospora.* A, B. Verrucose setae; C. Long conidiophore; D, E. Short conidiophores; F–H. Conidia; I, J. Separating cells. Scale bars: A–C = 10 µm; D–J = 5 µm.

or slightly curved, simple or rarely branched in the apical region, septate, verrucose, dark-brown, lighter in the apical region, 170–432 × 5–9.4 µm, and short conidiophores single or in groups with long conidiophores, erect, straight or slightly curved, simple or branched, septate, smooth, pale brown, 8–20 × 4–6 µm. Conidiogenous cells terminal, cylindrical, 6–12 × 4–6 µm, polyblastic, integrated, sympodial, denticulate, pale brown. Separating cells ellipsoid to subglobose, 7–10 × 2.6–4 µm, smooth, subhyaline, with one denticle on each end. Conidia originated directly from conidiogenous cells in the long conidiophores and from separating cells in short conidiophores, turbinated, obovate to obpyriform, subhyaline, 0-septate, 18–24.6 × 4.6–9 µm, with a supraequatorial subhyaline transverse band.

Specimens examined — **BRAZIL. Bahia: Una**, on decaying leaves of *Myrcia splendens*, 22/IX/2011, M.V.O.dos Santos 1360 (CEPEC 2361); on decaying leaves of

Pera glabrata, 22/IX/2011, M.V.O.dos Santos 1361 (CEPEC 2362); on decaying leaves of *Inga thibaudiana*, 2/IV/2012, M.V.O.dos Santos 1362 (CEPEC 2363).

Geographical distribution — Japan (Shirouzu et al. 2010), Brazil (this paper).

Comments — *Beltraniella botryospora* was previously described as associated with living and dead leaves of *Quercus acuta* Thunb. and *Q. salicina* Blume in Japan (Shirouzu et al. 2010). In Brazil, *B. botryospora* is now being reported in association with the leaf litter of three trees belonging to different families, none closely related to *Fagaceae*, clearly indicating its adaptability to a wide range of substrates.

The specimen's characters are consonant with the original description (Shirouzu et al. 2010). However, in the original description, the setae were larger (140–550 µm), the conidiophores were shorter (12–30 µm), and the conidiogenous cells were larger (10–20 µm), while the separating cells (5 µm diam.) and conidia (7.5–10 µm diam.) were narrower. Young and immature structures were not considered for measuring the dimensions of the setae.

Beltraniella botryospora is similar to *B. fertilis* due to the presence of setae, two types of conidiophores (long setiform conidiophores and short non-setiform conidiophores) with fertile apices, and turbinate conidia (Heredia et al. 2002). However, the conidiophores of *B. fertilis* branch more than once at the apex, whereas branching is rare in *B. botryospora* (Shirouzu et al. 2010); also, *B. fertilis* has smaller setae and narrower conidia (Heredia et al. 2002). *Beltraniella botryospora* is also similar to *B. portoricensis*, which differs by producing only one type of conidiophore (short non-setiform conidiophores; Pirozynski & Patil 1970).

This is the first record of *Beltraniella botryospora* in the Americas.

Beltraniella portoricensis (F. Stevens) Piroz. & S.D. Patil, Can. J. Bot. 48: 575 (1970)

Description and illustration: Ellis (1971, as *Ellisiopsis gallesiae*), Gusmão & Grandi (1996).

Specimens examined — **BRAZIL. Bahia: Una**, on decaying leaves of *Inga thibaudiana*, 22/IX/2011, M.V.O.dos Santos 1363 (CEPEC 2364); on decaying leaves of *Pera glabrata*, 22/IX/2011, M.V.O.dos Santos 1364 (CEPEC 2365); on decaying leaves of *Myrcia splendens*, 22/IX/2011, M.V.O.dos Santos 1365 (CEPEC 2366).

Geographical distribution — Cosmopolitan.

Comments — No previous records were found of associations between *B. portoricensis* and the three plants studied, and this is the first record of this taxon for the county of Una. *Beltraniella portoricensis* was found only in the first sampling. This species is commonly found in the leaf litter of various plants occurring in tropical, subtropical, and temperate regions (Grandi & Gusmão 2002) and appears to be adaptable regarding substrate (Hyde et al. 2007).

Key to *Beltraniella* species cataloged in Brazil

1a. Setae and separating cells present 2
1b. Setae and separating cells absent .... *B. japonica*

2a. Setiform conidiophores absent 3
2b. Setiform conidiophores present 4

3a. Setae smooth; separating cells clavate, often remaining attached on the conidial base .... *B. amoena*
3b. Setae verrucose; separating cells oval to fusiform .... *B. portoricensis*

4a. Conidiophore, simple or rarely branched at apex, with branching occurring once at most, up to 560 µm long; setae up to 550 µm long; separating cells subglobose to ovoid .... *B. botryospora*
4b. Conidiophore, branched at the apex more than once, up to 328 µm long; setae up to 202 µm long; separating cells obovoid .... *B. fertilis*

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